MARYLAND FISHERIES

PUBLISHED BY CONSERVATION DEPARTMENT OF MARYLAND

No. 19 BALTIMORE, MARYLAND November, 1932

CONTENTS

Page

TROUT-STREAM IMPROVEMENT IN MICHIGAN--COURTESY, AMERICAN FISHERIES SOCIETY ---- 1

DREDGING SEASON BEGINS ---- 7

THE LURE OF THE MARYLAND BASS STREAMS—BY RAYMOND H. MILLER ---- 10

POTOMAC RIVER BARS INVESTIGATED ---- 13

REPORT OF CRAB MORTALITY IN LOWER BAY—BY R. V. TRUITT ---- 15

EDITORIAL

MARYLAND VERSUS ORIENTAL CRABMEAT ---- 8

TROUT-STREAM IMPROVEMENT IN MICHIGAN

By CLARENCE M. TARZWELL, *Institute of Fishing Research,* University of Michigan.

(*Courtesy of American Fisheries Society*)

MAINTAINING trout fishing at its former standard of excellence is proving to be a serious problem. Fish-hatchery methods and fish culture are only two of the necessary steps leading to more and better trout fishing in our streams. Some thought must be given to the welfare of the fish after planting and attention to improving the habitat. We can no longer depend merely on stocking, because if conditions in the stream itself are not favorable, we cannot hope to be successful in producing large numbers of fish of suitable size. Conditions in the waters themselves must be bettered if the fish are to have adequate cover and food. It is possible to improve a stream considerably in counteracting the natural deficiencies by artificially improving upon what has been naturally provided or by restoring what man has destroyed.

Deforestation and lumbering practices have nearly ruined many of our streams; the former has removed shade and cover and has caused quick run-offs which are carrying immense quantities of ruinous sand into the streams every year, covering up the spawning beds and food-producing areas. One of the methods of lumbering was directly in opposition to the production of trout. Dams flooded the spawning beds and log drives scoured them out. Flooding for the drives widened the streams and washed into them non-productive sand which covered up the gravel. The rivers were cleared of all jams and cover before the drives and they were swept clear of any vestige of cover by the rush of logs. All these things—the destroying of spawning beds, the covering of great areas with sand, the excessive widening of the stream, and the removal of all cover—are now making themselves harmfully apparent. Perhaps the best way to regulate conditions already disturbed is to restore as nearly as possible original and normal conditions.

This problem is being attempted by the introduction of various types of barriers, hides, and covers. These devices are modeled after those made naturally. It is thought that they will accomplish several things toward restoring the streams to their former condition, such as: Digging pools, furnishing shade and cover, aiding in the production of more fish, stimulating food conditions, and improving fishing conditions as a sport.

Trout will not remain in a section that has no pools or cover. Pools are made by speeding up the current so that it will dig. This may be done, and has been done successfully, with a wing-type barrier made of a log or stone slanted down-stream from one bank at a 45° angle. This crowds the water to one side and so speeds it up, with the result that the current digs a pool. A raft made of logs and wired to the bank can be placed over this pool for cover. By producing more pools we secure more fish in a section, because one pool can support only a certain number of fish, due to food competition. Many natural pools are so exposed that trout will not lie in them. By putting cover over them they can be made into suitable places for trout. Some of the natural pools have been filled with sand. Speeding up the current will remove this, also.

A wing built from each side, forcing the stream through a narrow channel in the center, accelerates the current and causes it to dig in the sand a gravel-bottom pool 100-300 feet

long. The sand is piled up in a bar on each side behind the wings; thus the stream proper is narrowed and pools favorable for trout are produced. By means of a wing barrier the current can be thrown under a log so that it will dig a good pool under it. In gravel and stone sections, the wings increase the speed of the current and make a good riffle for a long distance down-stream. The fish will stay in the pools and feed in the riffle, so that a poor section can be transformed into good fishing.

The headwaters and small feeders coming in at the stream sides can also be much improved. The spawning beds in the headwaters can be changed by the introduction of wings to make the current faster and to keep the gravel beds clean of silt which, collecting on the trout eggs, would smother them. On hard bottoms in which the fish are unable to dig their nests, the wings, by means of the current produced, loosen the bottom material and sort it so that it may be fit for spawning beds. The work already done on the Little Manistee River has shown that new spawning beds can be made by removing the sand covering from the gravel. As many as eight rainbow beds have been noted around one of these wings where, before, the sand made it impossible to spawn. Increasing the spawning areas in this way is a great help because there is then more space for individual nests, and these nests are not so apt to be worked over by other spawners and the eggs destroyed.

The headwaters and side feeders can in many cases be made more favorable for the fry and fingerlings. Where the water is too shallow it can be brought to a suitable depth by placing a low dam of logs or stones across the stream. This will produce an area of still water above it and give a place for the young above the dam. The dark material which collects in the still water is the habitat of chironomids, midges, and other small forms which constitute the natural food of young trout. Plants will grow in this quiet water and furnish protection from predators. By this means, food and cover can be given to the young, and they are prevented from dropping down-stream where they would be devoured by the older fish. So by producing natural conditions here near the spawning areas, a larger production of young may be secured.

All barriers tend to increase the amount of food by creating a variety of conditions. While carrying on the active work of building the barriers, I was able to make 100 insect counts

in varying types of bottom, depth, and current. Plant beds, especially chara, are very productive. Rubble produces more than gravel, and coarse gravel more than fine. The dark material along the stream sides is very rich in smaller forms of insects. The kind, however, of the insect is much larger in the plant beds. Sand is very barren of life—in fact I found absolutely nothing in it, in many cases.

As for the sand itself, a thin layer of it is entirely as destructive as a thick bar. By cleaning the sand off the gravel and concentrating it in a heavy bar behind the barrier, a large area of gravel will be exposed. Dark, mucky material collects on the bars in the still water behind the barriers, as I have already noted, producing food habitats. Plants soon establish themselves in the muck on the bars, making the sandbar useful instead of ruinous. This quiet water behind the barrier is, literally, a rich, warm-water nursery for young trout. When the bottom is already gravel the speed of the current sorts out the finer material so that more food will be produced in the coarser material that remains. I have also found that, up to a certain point (not exactly determined), a swifter current produces a greater quantity of food.

The larger forms, such as stone flies, hellgrammites, and certain caddis and May-flies prefer a swift current. The still, shallow water behind the barriers makes a suitable environment for the smaller forms of life, such as protozoa and algae forms, which are the food of trout-stream insects. The wings concentrate all the drift food into one food channel and send it over the pool below, with the result that the trout can secure more of the drifting insects which may have fallen into the stream.

From information gleaned from fishermen this year and last, the barriers improve fishing conditions in general and fly-fishing in particular. Different types are constructed so that each pool is slightly different than the next and gives slight versatility in fishing. The food channels thrown along the hides and covers make excellent places for dry-fly fishing, since the barriers localize the fish for the fishermen. Fish have been reported caught from under barriers that were not 24 hours old, and as many as six fish have been taken from under another. A sand section on the Little Manistee River, which fishermen invariably omitted, after improvement last year, has been fished with success this year.

There are at present 850 barriers under observation in the

following rivers: Little Manistee, East Branch of the Black, Pigeon, Huron, Rifle, and Gamble. Data are taken on each barrier constructed so the original conditions are known and any change can be noted.

The cost of improvement in a stream, averaging 30 to 40 feet in width, is $100 to $200 per mile, varying with the stream condition, the availability of material, and solidity of bottom. This year a flood test was carried on in the Pigeon River where 71 barriers built there were exposed with intention to a 22-inch flood slightly higher than a normal spring flood. None of the barriers were lost.

In conclusion, during the two years of field demonstration, this project of trout-stream improvement has been successful on the whole. It is planned to continue the work next year in various streams in the state, with a check of those dams built this year, in the hope of further progress and success.

WALTONIANS MEET AT FREDERICK, MD.

THE ANNUAL MEETING of the Maryland-District of Columbia Regional Council, I. W. L. A., executive committee was held at the Francis Scott Key Hotel, Frederick, Md., on the evening of October 15, 1932, following a delightful dinner in the Coffee Shop of the hotel.

The following Waltonians were present:

Dr. M. D'Arcy Magee, president, Regional Council.
E. B. Carl, vice-president, Regional Council.
H. B. Maccubbin, Regional Council.
H. M. Waddell, secretary-treasurer, Regional Council.
Hon. Raymond Miller, Williamsport chapter.
H. M. McFadden, president, Hagerstown chapter.
McK. Stowell, Washington, D. C., chapter.
Dr. Louis Radcliffe, Bureau of Fisheries, Washington, D. C.
C. S. Hahn, secretary-treasurer, Frederick chapter.
Geo. B. Kelly, Sandy Spring chapter.
Mr. A. M. Powell, Superintendent, Md. State Hatchery.

The meeting was called to order by Dr. Magee, who asked for the minutes of the last regular meeting of the council at Hagerstown, Md., last March. Minutes approved as read by secretary. A letter of encouragement and good wishes from Mr. Locke, League Conservation Director, was then read.

Dr. Magee then analyzed the last quarterly membership report from headquarters and called attention to the fact that, in spite of the trying conditions, the council had lost less than one-third of its membership within a year. He then asked for expressions as to the wisdom of a personal trip by the president and secretary to the various chapters of the State, which are lagging in membership and activity, and also for suggestions as to the forming of new chapters to be organized. It developed that chapters were being planned for Detour, Oakland, and Ellicott City, Md., and all present joined in a discussion of ways and means of holding the present members of our chapters and obtaining new members. The consensus of opinion was that while the depression was in a measure to blame for the falling off of memberships, at the same time lack of aggressive leadership in some chapters and the want of a definite and carefully planned program of chapter activity in others was responsible for loss of interest among their members. It was also stated that most chapters have entirely overlooked the value of having a sound educational program, something new at each meeting, in order to hold member interest. Mr. Powell suggested that the State Conservation Commission would be glad to cooperate with any chapter in this educational work.

The work before the sportsmen's committee on black-bass legislation was discussed, and the following resolution was adopted:

> RESOLVED: That the Maryland-District of Columbia Regional Council, I. W. L. A., is 100% back of the black-bass legislation committee, its chairman, Mr. E. B. Carl, and the Hon. Raymond Miller in the fight to ban the sale of black bass in the markets of the State at all times, and we offer to these men every possible aid and assistance we can render.

A letter from the Frostburg chapter was then read. It expressed regret that they could not send a delegate to the meeting but pledged the chapter to stand 100% against the sale of black bass in the markets of the State. A plea for uniform county game laws was also included in the letter and the matter will be referred to the proper authorities.

Due to the existing economic conditions and the proximity of the black-bass fight, it was decided that new officers would not be elected until the spring meeting and convention of the council. The Hagerstown chapter extended its usual cordial invitation for the meeting to be held in that city, and the matter was referred to that chapter for further report. In

order to put this meeting over, it will be necessary for each chapter to make a substantial financial contribution to the regional council fund, and in order that there be no drain on the treasuries of the chapters, each one is urged to hold trapshoots, dances, etc., between now and April 1, and send the profits to the council secretary-treasurer. Let's all get behind this important duty and each chapter do its bit.

After a vote of thanks to Mr. Hahn for making arrangements for our meeting, the committee adjourned to meet again at Frederick, Md., Dec. 3, 1932, at 6:30 P. M. Each chapter is to send two delegates.

H. M. WADDELL, *Secretary-Treasurer.*

DREDGING SEASON BEGINS

THE dredging-scraping season for oysters, which opened on Tuesday, November 1, in the waters of the Chesapeake Bay, Tangier Sound, and part of the Great Choptank River, has enabled the Conservation Department to check up on conditions in several localities where the quantity, yield, and young growth were uncertain.

The fleet of schooners, bugeyes, and skipjacks this year numbers less than 100. These boats have been working along the Calvert County shore of the Bay, along Parker's off Herring Bay, and in the upper Chesapeake, above Sandy Point, as well as the Kent Island shore of the Bay.

Reports in the upper Bay show very extensive growth of young oysters, but a very limited quantity of oysters of marketable size, although the quality of the latter is very good. The oysters on Parker's and the Calvert Bay shore are good, but the quantity is also somewhat limited. A few boats have been working in the Great Choptank River, and a report coming in from Tangier Sound indicates more than 70 scrapeboats are engaged on the rocks in this body of water, and the supply and quality of the oysters are both good, although the market price at present is very low.

The tributary waters of the Chesapeake, where tonging alone is permitted, show a bountiful supply of oysters, and many run-boats are engaged in freighting the tongers' cargoes to Baltimore, Crisfield, Cambridge and other markets.

Oysters have improved considerably since September when the tonging season opened in the State, and during the past few weeks are not only fatter but show considerable growth of shell.

MARYLAND FISHERIES

PUBLISHED BIMONTHLY BY CONSERVATION DEPARTMENT,
SWEPSON EARLE, Commissioner.

No. 19 BALTIMORE, MARYLAND November, 1932

MARYLAND VERSUS ORIENTAL CRABMEAT

ON October 4, 1932, a delegation of representative citizens from Somerset and Talbot Counties, interested in the sea-food industry, journeyed to Washington, D. C., to attend a hearing before the Tariff Commission on the importation of foreign crabmeat. Some of these men undoubtedly returned to their homes convinced that a new "yellow peril," in the form of Japanese and Russian crabmeat, threatens the blue-crab industry of Chesapeake Bay.

The peril, of course, lies in the fact that the people of the country, seeing the Japanese crabmeat widely and cleverly advertised in magazines and newspapers, and finding it always conveniently at hand on the shelves of grocery and delicatessen stores, *may* come to prefer it to the fresh product of the Chesapeake and nearby regions. Of course, in our opinion, there is no comparison between the two products, the Japanese article being coarse and reddish, (somewhat on the lobster order), whereas, the delicacy of the meat of our blue crab is unique.

At the Tariff Commission hearing, it was brought out that the United States produced 83,331,000 pounds of crabs, valued at $2,568,000. Of this amount, 68,760,000 pounds, valued at $1,722,000., were caught in Maryland and Virginian waters. Thus it may be seen that the bulk of the American production comes from the Chesapeake.

During 1930, the United States imported about 10,000,000 pounds of crabmeat, valued at $4,600,000. Practically all of this was a canned, hermetically sealed article from Japan, and a duty of 15% *ad valorem* was placed on all crabmeat entering the United States. On the basis of the foregoing, we learn that the people of the United States consumed about 20,000,000 pounds of crabmeat in 1930, of which about one-half was domestic.

The Conservation Department, through its Sea-food Auditor, has been making a very careful survey of the crab industry of Maryland, in an effort to determine where the supply of crabs and crabmeat is at present being marketed. To our astonishment, it was found that crab shippers are limited in their market to a few nearby states and cities. With the increase of crabs in our waters during the past five years, these markets have naturally become somewhat congested, and prices obtained have been too low for the watermen and packers engaged in the business to make more than a bare living.

At a meeting held by the Conservation Commissioner at Crisfield on October 19, before the sea-food committee of the local Chamber of Commerce, these facts were revealed, and it was proposed to organize units throughout tide-water Maryland, to be followed by a State-wide organization, for the purpose not only of working out an efficient system of marketing crabs and other sea food but to prevent waste in these industries.

It has been estimated that one-third of the crab production of Maryland during the past two years has been improperly marketed, and if standardization could be obtained and a more efficient system be worked out, either by canning or quick-freezing, it will enormously aid the people engaged in the industry, and at the same time widen the distribution of this important sea food of Chesapeake Bay and combat the encroachments of the Oriental product.

JAPANESE OYSTERS IN SHELL TO BE BARRED

An article appearing in the September issue of this magazine called the attention of Maryland oyster packers and planters to the danger of introducing Japanese oysters into Maryland waters, the government being quoted as authority for the statement that the local industry would suffer as a result of such introduction. In addition to the possibility of cross-breeding, which would result in an inferior oyster, there is also danger of introducing pests, such as the oyster drill, and other shell-fish parasites, which in time might destroy our native oysters entirely.

With this threat in mind, Commissioner Earle will urge the General Assembly, which meets in Annapolis in January, to enact legislation prohibiting the shipment or importation into Maryland of Japanese oysters for planting purposes.

THE LURE OF THE MARYLAND BASS STREAMS

Radio Address by RAYMOND H. MILLER over Station WMAL, Washington, D. C.

OUT IN MARYLAND near the foothills of the Alleghanies, is the modest beginning of one of America's famous rivers. Out of the side of a mountain, trickles a cool, clear, sparkling stream. It gathers strength and volume as it sweeps through a channel of its own construction, cut out of the largest mountains in the State. It widens along its winding course through valleys of fertile farm lands and scenes of rare pastoral beauty. It gathers force on its turbulent course to break through the Blue Ridge mountains amid the rugged scenery of Harper's Ferry. It rushes beyond Point of Rocks, expending itself in one supreme effort, dashing first over Great Falls, then over Little Fall, and soon settles into a broad calm, as its currents are absorbed in the quiet tidal waters of Chesapeake Bay.

The Potomac River was christened by the Indian tribes which inhabited its shores in the early days of our country. The name is said to have signified in the Indian language "plenty of fish," and it is known that the fields and forests bordering its shores abounded in all kinds of game.

The first white man known definitely to have explored the lower Potomac was none other than the valiant Capt. John Smith, in June, 1608, who stated in his diary "that abundance of fish, lying so thick with their backs above the water, as for want of nets, we attempted to catch them with a frying pan, but we found it a bad instrument to catch fish with; neither better fish, more plenty, nor more variety, had any of us ever seen in any stream."

George Washington tells in his diaries of many fishing trips he took in company with friends, and made a careful record of the days when fortune favored or fate frustrated his quest. In the years between the first President and the present occupant of the White House, there have been many Chief Executives who have found fishing to be their favorite recreation.

There is in all of us some of the inherited traits of our frontier forefathers. Fishing and hunting are in our blood. It may be only an undefined longing; we may not suspect its nature, but it is in the core of every male of our old American stock.

Every great man we have ever had was an outdoor man. Every man with worth-while thoughts sometimes wishes to forget petty policies, wishes to get away from the little things that cramp and bind and is forced to seek relaxation, new energy, and a broader outlook by contact with nature.

Many places of scenic value and events of historical interest are adjacent to and closely associated with the valley of the Potomac. The early march of civilization on the western hemisphere blazed a trail across the Alleghanies, paralleling the Potomac River. This trail, known as the National highway, or Maryland's main street from East to West, is the oldest roadway in the country leading westward, and it delights the present-day motorist at every turn with new scenes of surpassing beauty.

Forts were built along this river highway in the early days to protect the settlers from the ravages of Indians. Fort Cumberland in Western Maryland was used as a base of operations by General Braddock in his ill-fated campaign against the French and Indians. Fort Frederick, near Big Pool, was a haven of refuge for early Maryland settlers. It is in a fine state of preservation today, and annually attracts thousands of visitors. Traveling eastward we come to Williamsport, seriously considered by General Washington for the capital of the nation. Williamsport, Hagerstown, Sharpsburg, in Washington County, attract hundreds of visitors every season in their quest for black-bass fishing in the Potomac. Antietam battlefield, near Sharpsburg, is a national shrine, and is a Mecca for thousands of tourists every year; close by at Boonsboro are natural underground caverns of great beauty. At Shepherdstown, on the Potomac, is erected a monument to James Rumsey, the inventor of the first steamboat which was propelled successfully under its own power for some distance up and down the Potomac. At Harper's Ferry, close by the historic city of Frederick, the scenery is said by world travelers to rival that of the Alps, and bass fishing in the Potomac at that point attracts anglers from far and near. Finally we pass Great Falls to arrive at the Nation's Capital, where the Potomac widens and lends its broad bosom to the commerce of the world, and becomes the foraging ground of many commercial fishermen.

The intensive fishing for bass in the Potomac River and its main tributaries in Maryland, the Conococheague, the Antietam, and the Monocacy, without adequate restocking, has diminished the value of these fishing shores to a fraction of

their former worth. Deep Creek Lake in Garrett County, one of the beauty spots of Eastern America, is being restocked with pike and small-mouth bass and is attracting hundreds of people from Maryland, Pennsylvania, and West Virginia each season.

Surely the citizens of Maryland have been neglectful in protecting and developing one of our great natural resources. With our splendid bass streams and natural environment we are one of the few states which exploit our bass in a commercial way during eight months of the year, the market being closed only during April, May, June, and July to commercial sale. Anglers know that commercial fishing is at its best during the winter and early spring months when bass are sluggish and are easily taken in nets. Our sister states of Virginia, and Pennsylvania, and the District of Columbia prohibit sale at all times, and Maryland under its present law becomes the dumping ground for black bass, bootlegged in from other states. This is not fair to the anglers of those states who have worked hard to prohibit sale within their own borders, and the only remedy for the indiscriminate slaughter of black bass is to close all markets to commercial sale. Lawmakers now understand that where there is one commercial fisherman, there are 500 who fish for recreation and relaxation, and it is estimated that there are 30 men who fish for black bass to one who fishes for any other variety of fresh-water game-fish.

Food fish for commercial purposes in the Chesapeake Bay Country are plentiful and black bass are the small part of the commercial catch. Statistics from the Department of Commerce, Bureau of Fisheries, show that the commercial catch of black bass in Maryland has decreased approximately 80% in 10 years. Do not these figures show conclusively that the supply of this species is rapidly becoming depleted, and the number has dwindled at an alarming rate, until now we are dependent on the help of state, federal, and sportsmen's organizations to contribute time and money in a vigorous restocking campaign in order to perpetuate the supply of this great game-fish in our waters? In connection with this we wish to state that it is contrary to state and federal policy to continue propagation and restocking in a state which does not afford adequate protection to the species propagated.

A bill will be introduced in the 1933 session of the Maryland Legislature to prohibit the sale of black bass at any time during the year, and to prevent shipment into or out of the

state for purposes of sale, and we want to urge all of you who are interested in preserving this fine game-fish for posterity, to get behind this important measure and make a personal plea to members of the Maryland Legislature to vigorously support this bill.

It does not require a student of economics to understand that the influx of visitors, to view Maryland's scenery, to examine her many points and places of rich historical interest, and to enjoy the privilege of communion with nature along the banks of her black-bass waters, will pay handsome dividends to present as well as future generations. Maryland cannot afford to let these splendid natural attractions pass to other states more far-sighted, and no matter if you are interested in bass fishing or not, no citizen of our commonwealth should neglect the opportunity to urge and promote favorable sentiment toward the protection and furtherance of our great natural resources.

POTOMAC RIVER BARS INVESTIGATED

IN COMPLIANCE with the promise made to the watermen of Somerset County at the meeting held at Crisfield on September 7, the Conservation Commissioner, accompanied by Chief Clerk H. H. Johnson, proceeded to Crisfield on the 19th of October, and there met a special committee, which included Mr. Wallace M. Quinn and Captain Warren Evans, of Rhodes Point. Honorable J. C. Webster, Senator from Calvert County, who is very much interested in the Potomac River situation, accompanied the Commissioner to Crisfield.

On the morning of the 20th, the committee, headed by Captain Clarence Lattimore, chairman, of Upper Fairmount, Captain Oliver P. Owens, of Dames Quarter, Captain John Benton, of Deal's Island, Captain Wallace Catlin, of Crisfield, and Captain A. S. Middleton, of Ewell, boarded the State steamer at Crisfield at 7 A. M. Captain Will Smith, of the skipjack "Bernice J.," equipped with two oyster mud-dredges, and manned by a crew of three, proceeded to the Potomac on the 19th to await the steamer off the mouth of Smith's Creek.

The afternoon of the 20th, the 21st, and the morning of the 22nd of October were spent making investigations on the main oyster bars of the river. (Report of these examinations is covered by the watermen's report.)

It is of special interest to note the marked improvement made by the oyster bars of Potomac as a result of the rest period of about one year. At the close of the oyster season of 1931, a dredger could not make a livelihood on any of the bars. On Sheep's Head, Swan Point, Cedar Point, and Ragged Point, the report shows that as many as 100 or more bushels of oysters could be taken in a day's work; while at Cobb Point, it was estimated that from 75 to 110 bushels per day could be harvested. The oysters examined were in very good condition, and the tongers were making a satisfactory livelihood in the vicinity of Blackistone Island, Higgin's Point, and Heron Island bars.

A conference will shortly be held with the Commissioner of Fisheries of Virginia, relative to the Potomac River situation, as the Virginia watermen along the Potomac are also much interested in the subject.

The report of the watermen's committee accompanying the Commissioner on this inspection trip of the oyster bars of Potomac is as follows:

CRISFIELD, MD., October 25, 1932.

HON. SWEPSON EARLE, *Commissioner*,
Conservation Department of Maryland,
516 Munsey Building, Baltimore, Md.

DEAR MR. EARLE—At the suggestion of the oyster dredgers of Somerset County to have you come to Crisfield to see what could be done as to the opening of the Potomac River, which was closed by the Act of the General Assembly of 1931 and has remained closed for one entire season, you addressed a meeting of our captains at Crisfield on September 7, last, at which time you offered to cooperate in having the Potomac River oyster bars examined by a committee of the oystermen.

Accordingly, the following committee was appointed: Capt. Clarence Lattimore, chairman, Upper Fairmount; Capt. Oliver P. Owens, Dames Quarter; Capt. John Benton, Deal's Island; Capt. Walter Catlin, Crisfield; Capt. Will Smith, Tylerton; and Capt. A. S. Middleton, Ewell.

This committee, in company with Mr. Wallace W. Quinn, of Crisfield, and Captain Warren Evans, of Rhode's Point, met you, Senator J. Cook Webster, and Mr. H. H. Johnson, chief clerk of the Conservation Department, on Thursday morning, October 20, at seven A. M. on board the Steamer "Du Pont" and proceeded to the Potomac River.

After examining by dredges Sheep's Head, Cobb Point, Lower Cedar Point, Swan Point, and Ragged Point bars, during Thursday, Friday and Saturday following, in the skipjack "Bernice J.," commanded by Captain Will Smith and equipped with two oyster mud-dredges and manned by a crew of three, we submit the following report:

It is estimated that with a skipjack the size of the "Bernice J.," or a 300-bushel boat, manned by four men and using 40" dredges, one could catch in one day on Sheep's Head bar from 75 to 100 bushels; on Cobb Point bar, 75 to 100 bushels; on Cedar Point bar, 75 to 100 bushels; on Swan Point bar, 100 to 125 bushels and on Ragged Point bar, 85 to 100 bushels.

On practically each of these bars we caught with one dredge approximately ¾ of a bushel of merchantable oysters. In actual count they would range from 132 to 200 large oysters and about one-third of that quantity of smaller oysters; that is, oysters ranging from one to two inches. The balance of the dredge was filled with shells on each dip with the exception of Cobb Point bar, where the dredge was not quite suitable to test them on the sand bar as a mud dredge was being used. We did not count the number of spat found on the shells. However, examination showed that there was some spat of this year's catch but not in any great quantity.

All conditions, such as the weather and boat, were ideal except that on Cedar Point we were compelled to use the power-boat "Kent" instead of the sailboat, as the latter had not yet arrived.

Sufficient catch was noticed on the examination of Cedar Point bar to justify our original estimate of 75 to 100 bushels per day.

We did not test any other bars than those above mentioned but there were a number of bars, such as Higgins Point bar (locally known as Huggins Bar) and Heron Island, where tongers are now working and making satisfactory catches.

There was no difficulty in culling the large oysters from the smaller ones and with the proper application of the cull law, the supply seems adequate for another year.

There is a marked improvement in the quantity of oysters at present on these bars over what prevailed at the close of the dredging season, March 15, 1931. The oysters are of excellent quality and appear to run approximately one-third counts, one-third selects, and one-third standards.

Swan Point oysters seem to be of a little better quality than the others.

Although we thanked you personally before the termination of the trip for the hospitality shown us during this investigation and your making it possible for us to lay before the other oystermen and the people the actual condition of the bars of this river as we see them, we want to take this opportunity to again express our appreciation.

Yours very truly,

INVESTIGATING COMMITTEE OF THE POTOMAC RIVER.

Per: CLARENCE LATTIMORE, *Chairman.*

REPORT OF CRAB MORTALITY IN LOWER BAY

FOLLOWING previous reports indicating that there was an unusually heavy mortality among crabs in the lower Chesapeake Bay during the first part of September, a hurried trip was made to Hampton, Norfolk, the Lynnhaven Bay region, and to Buckroe Beach, as well as in the Cape Charles section on the east side of the Bay. The trip was made by automobile in order to expedite the work.

Crabs were found dead in vast numbers, the Lynnhaven shores being especially heavily strewn with them. Only in the rarest of instances were crabs found above Hampton and Portsmouth. Below Buckroe a light deposit of crabs was found on the shore, while above that section only an occasional crab

was found. In the lower Lynnhaven, well on down to Cape Henry, myriads of dead crabs, in places, were found. Below the cape, dead crabs were found on the shore in considerable numbers. They were found in smaller and smaller numbers, however, southward, until at eight miles below Virginia Beach very few were found. On the east side of the Bay barely any dead crabs were found at all. As many as 54 dead crabs were found in a nine-square-yard area (3 yds. x 3 yds.), in one of the most heavily strewn areas.

Previous to this inspection trip there had not been a severe storm of any moment in the Chesapeake territory. As far as could be seen and could be gathered from local watermen, there had been no catastrophic event of any kind in the water to wreak havoc on the crabs. No other fishes were disturbed. With extremely minor exceptions, only fully matured females were observed dead on the shore. The exceptions comprised 38 mature males, four immature females and three immature males. These observations were carried on over approximately 32 miles of shore-line and, in various stages of decomposition, thousands upon thousands of adult females were noted. In a few cases egg-bearing crabs were found on the shore, 60 altogether, many "berried" crabs were still in the Bay waters, the temperature of which, at the time, being 72°.

As said, the crabs were in varying stages of decomposition. As jetsam, they were still being thrown upon the shore by the tides. From appearances, a goodly proportion of the crabs had been dead for a week or 10 days. Observations of local fishermen, and others along the waterfront bore out this opinion, it being indicated that the high death-rate set in during late August. The crabs did not come to the shore to die, but, after dying in the water and decomposition having set in, they were easily carried by currents and thrown upon the shore.

Many observations were made in the field, and on crabs transported to the Laboratory, to ascertain whether or not the dead crabs were recently mated individuals, or females that had already spawned out. In the decidedly greater number of cases the tissues, especially those of the genitalia, were in such a high state of putrefaction that no reliable observations could be made. In every case, with the exception of the few virgin individuals already referred to, where worth-while examinations could be made the genital organs were flabby, shrunken, and pale in color, indicating the spawning had taken place. Not a single crab with swollen ovaries and an abundance of mature ovarian eggs was found. Most of the living

female crabs in the region showed an abundance of such eggs. The color of the ovaries of the dead crabs was changed from the common, high-orange shade to a rather straw brown. However, this fact was not given much weight in the survey, since decomposing activities might readily have accounted for the change.

From previous reports in the Lynnhaven section such a high death-rate among mature female crabs is not uncommon during late summer. However, there are no permanent or substantial records in this connection so far as we know. This first-hand observation should form a basis for future comparisons. Many of us who previously have carried on crab observations have been of the opinion that almost constantly throughout the year old, spent, sex-exhausted females simply yield to senility and die, high waves of such mortality arriving in August and in late winter, according to weather conditions and possibly other factors of the environment.

There are very good reasons to believe that the present high death-rate among crabs in the lower Bay is due to natural causes, the crabs having passed the normal life in a biological way, spent their vital energies, and were no longer able to function.

R. V. TRUITT.

OYSTERS MOVED FROM POLLUTED ZONE DO WELL

In response to a petition received during the past spring from Cambridge, Md., the Conservation Department arranged to have the watermen of that locality take up the oysters growing in the zone of polluted water adjacent to the City of Cambridge and transfer them to a bar in the Great Choptank River, known as Boling Broke Sands. During the course of this operation, which took place late in April, some 9,000 bushels of oysters were removed.

Inspector A. Hallie Creighton, of Cambridge, reports, under date of November 2, 1932, on the condition of these oysters on the day after the area was declared open to public tongers as follows:

"Tuesday was a stormy day and the tongers did not get to try the oysters that were removed from the polluted bottoms last spring. Today, there were 56 tong boats working on them, and they caught from 7 to 18 bushels per boat, two men to a boat.

"They were of the finest quality and shucked a little over 7 pints per bushel. I think about 550 bushels were caught in the first day's operations, and many of them went to Oxford."

AMONG THE COMMERCIAL FISHERMEN

The season just passed has been an unusually good one for commercial fishermen, and a report received from Captain Herman A. Woodfield, of Galesville, Anne Arundel County, who is a member of the Advisory Committee, states that just a week ago the pound-net fishermen brought in 14,000 pounds of trout. These fish weighed from one to four pounds. This catch is several weeks later than the pound-nets were working last year.

Bluefish have also remained in our waters later than usual and have been plentiful. At Galesville the net fishermen have been bringing in from 3,000 to 4,000 pounds a day. It was reported last week that bluefish had migrated down the Bay, and it is anticipated that trout will follow them with the next cold spell.

Captain Woodfield also reports that with the last catch of trout coming in to Galesville, about 50 pounds of rock, ranging from two to four pounds each, were in the cargo. Striped bass have not been plentiful in the upper Bay during the past summer. The commercial fishermen blamed the bluefish for driving them out of the upper Bay, while the sport fishermen claim the purse-nets last year cleaned up all the rock.

Chumming for fish by anglers has developed into such a sport that thousands of pounds of alewives are ground up and then used to bait the fish. Most of the fishing boats are equipped with small meat-grinders for this purpose.

OYSTER ODDITIES

THE OYSTER, in its selection of a home, often exhibits an apparent eccentricity of taste, if the collection of curious objects on display in the offices of the Conservation Department is a fair sample of the types of abiding place it prefers. Glass bottles, rubber boots, pipes, stones, twigs, china dishes, fish nets, and even spectacles and false teeth are among the curiosities found to contain growing oysters. The most interesting specimen in the Conservation Department's collection is a pair of shell-rimmed eye-glasses, attached to the still intact lenses of which are three oysters, two about two inches in length and the third of marketable size. This oddity was taken from the Miles River and must have been overboard at least two years, judging from the size of the oysters.

COLLECTION OF CULTCH SPECIMENS

AMONG THE COMMERCIAL FISHERMEN

The season just passed has been an unusually good one for commercial fishermen, and a report received from Captain Herman A. Woodfield, of Galesville, Anne Arundel County, who is a member of the Advisory Committee, states that just a week ago the pound-net fishermen brought in 14,000 pounds of trout. These fish weighed from one to four pounds. This catch is several weeks later than the pound-nets were working last year.

Bluefish have also remained in our waters later than usual and have been plentiful. At Galesville the net fishermen have been bringing in from 3,000 to 4,000 pounds a day. It was reported last week that bluefish had migrated down the Bay, and it is anticipated that trout will follow them with the next cold spell.

Captain Woodfield also reports that with the last catch of trout coming in to Galesville, about 50 pounds of rock, ranging from two to four pounds each, were in the cargo. Striped bass have not been plentiful in the upper Bay during the past summer. The commercial fishermen blamed the bluefish for driving them out of the upper Bay, while the sport fishermen claim the purse-nets last year cleaned up all the rock.

Chumming for fish by anglers has developed into such a sport that thousands of pounds of alewives are ground up and then used to bait the fish. Most of the fishing boats are equipped with small meat-grinders for this purpose.

OYSTER ODDITIES

THE OYSTER, in its selection of a home, often exhibits an apparent eccentricity of taste, if the collection of curious objects on display in the offices of the Conservation Department is a fair sample of the types of abiding place it prefers. Glass bottles, rubber boots, pipes, stones, twigs, china dishes, fish nets, and even spectacles and false teeth are among the curiosities found to contain growing oysters. The most interesting specimen in the Conservation Department's collection is a pair of shell-rimmed eye-glasses, attached to the still intact lenses of which are three oysters, two about two inches in length and the third of marketable size. This oddity was taken from the Miles River and must have been overboard at least two years, judging from the size of the oysters.

COLLECTION OF CULTCH SPECIMENS

It is a well-known fact that a mature female oyster produces from ten to fifty million eggs a year, which when "ripe" are ejected into the water. Coming in contact with the sperm of the male oyster, thrown off about the same time, a small percentage of the eggs are fertilized, and develop, within a few hours, into free-swimming larvae. These larvae, after swimming about the surface of the water for a period of some 17 days, develop shells, the weight of which carries them toward the bottom, and the first hard, clean surface with which they come in contact on their downward journey is the one to which they attach themselves for life. It will be seen, therefore, that the oyster does not actually seek its home—it takes whatever is offered, and it is extremely interesting to note the curious objects on which young oysters are often found growing.

In 1927, when the General Assembly of Maryland passed a bill providing funds for the rehabilitation of the depleted oyster areas of the State, many suggestions were offered to the Conservation Department as to the advisability of utilizing brickbats, stones, and debris of various kinds for planting on the bottoms instead of oyster shells, which it was thought were more valuable for grinding into chicken feed or making into lime. From our own experience, however, and on the advice of the U. S. Bureau of Fisheries and our own biologist, the Department decided that oyster shells were the best and cheapest cultch to use for rehabilitation purposes, and, accordingly, has been planting on an average of 1,000,000 bushels of shells a year on the depleted bars of the Bay and tributaries.